

DISTURBANCES PRODUCED IN THE RECTUM BY DISEASE ELSEWHERE*

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THIS paper embodies a study of rectal symptoms and manifestations, conducted over a period of two years, in the general run of patients who have presented themselves for treatment in the medical out-patient's service of the Royal Victoria Hospital, with rectal disturbances as their outstanding features, or with rectal disturbances secondary to other more obvious and troublesome signs and symptoms elsewhere.

In the series of cases which form the object of this study it was surprisingly common to find rectal dysfunction, with the pathological process situated elsewhere, either in adjoining anatomical structures, or far removed in one of the other systems. I will not refer in this paper to patients with rectal signs and symptoms who had primary rectal disease, such as carcinoma, hæmorrhoids, fissure, fistula, etc., but rather to those with rectal manifestations secondary to pathological processes elsewhere, the primary trouble being in many instances eclipsed by the bowel disturbance.

The study was carried out quite satisfactorily by inspection, by careful digital palpation, and by a small bi-valve speculum, with proper illumination. By these means it was possible to properly determine the basis for rectal symptoms and findings, and in many instances to recommend proper treatment. The symptoms presented were numerous, and consisted of frank rectal pain, bleeding, tenesmus, itching, low-down pain (sacral) before, after, or during defæcation, discharge, inordinate constipation, feeling of a mass (even after a satisfactory evacuation), and incontinence, complete or incomplete. The signs ranged from hæmorrhoids, fissure, fistula, prolapse (partial), ulceration, abnormal fixation of the rectal tube, distortion of the rectum by adjacent disease, spastic or relaxed sphincter, and dilatation or undue narrowing of the lumen. In many cases the information was quickly volunteered of occasional bleeding, pain, incontinence, etc. In others the

rectal disturbance appeared to dominate the picture, the patient coming for treatment because of some distressing condition of the terminal bowel.

It is now necessary, in order to properly appraise this study, to review some salient points in rectal anatomy and physiology.

THE ANATOMY AND RELATIONS OF THE RECTUM
CONCERNED IN THE STUDY

The rectum is really the dilated portion of the distal colon, which communicates with the exterior through the anal canal. It should be remembered that the length of the rectum is between five and six inches, rather shorter in females, and varying slightly in different individuals. It can therefore be seen how easily one can, with a proper technique, examine digitally practically three-quarters of the length of the rectum. In some instances with the patient in the knee-chest position, or with the knees well drawn up on the abdominal wall, by invaginating the buttocks, one can reach within a short distance of the pelvi-rectal junction. The ampulla (often the site of rectal cancer) represents three and a half to four and a half inches of the length. The diameter of the rectal lumen is smallest above at the pelvi-rectal junction, expanding below in the ampulla, and again narrowing at the perineum.

The rectum begins at the level of the third sacral vertebra, where it is continuous with the pelvic colon, and ends where it pierces the pelvic diaphragm, at a point about one and a half inches anterior and somewhat below the tip of the coccyx. Descending in the concavity of the sacrum and coccyx, it then rests for about one and a half inches on the pelvic floor, formed by the union of the two levatores ani. Opposite the prostate, in the male, it bends backward at a right angle, as the perineal flexure, to end in the anal canal.

Although the rectum is fairly fixed in the pelvis, it is nevertheless capable of marked variation in diameter, and any encroachment

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upon or distortion of its lumen by disease of the surrounding structures is easily recognized. At the same time, undue fixation, to a greater degree than one normally finds, is quickly recognized to be due to disease or changes in the surrounding tissues or organs. The normal amount of anatomical fixation of the rectum is accomplished by the peritoneum, which holds it to the posterior pelvic wall, and also forms its lateral supports, by the blood vessels with their fascia, and by the recto-vesical folds. Its perineal portion is more firmly fixed to the structures forming the perineum, especially the levatores ani, their superior fascia, and the recto-coccygeal ligament.

The anterior reflection of the peritoneum is of importance in this study; in the male, on to the bladder forming the recto-vesical pouch, and on to the upper part of the vaginal vault and uterus in the female, forming the recto-vaginal pouch, or cul-de-sac of Douglas.

The relations of the rectum differ in the two sexes. The anterior relations are obviously of the greatest importance. In both sexes, the peritoneal cul-de-sac already mentioned usually contains the pelvic colon or small intestine. In lesions of the pelvic organs this pouch may contain the contents of a tubo-ovarian abscess, the collected blood of a seeping or ruptured ectopic gestation, or become the pathway through which a recto-vesical or a high recto-vaginal fistula will run. Through here one may feel malignant metastatic glands and general pathological changes of those organs which come into anterior relationship with the rectum.

In the male the rectum below the peritoneum is in close relation from above downward with the trigone of the bladder, prostate, seminal vesicles and urethra. The ureters near their ending in the bladder cross close to the sides of the rectum, at the level of the trigone. A common cause for rectal pain and discomfort, often overlooked, is one related to the seminal vesicles, which come into extremely close relationship with the rectum. They slope laterally and posteriorly around the front and sides of the rectum (much more so when the bowel is slightly distended), which they thus embrace, as it were, within their grasp. In inflammation or congestion, with secretion, of the seminal vesicles, the pain is dull or sharp, felt low down in the rectum, and tolerable, but it is

greatly aggravated by defæcation, particularly when large solid stools are passed, which, naturally, exert much pressure upon these structures.

In the female, from above downward lie the posterior surface of the broad ligament, the neck of the uterus, cervix uteri, and posterior vaginal wall. The posterior relations of the rectum as it lies in the sacro-coccygeal cavity are not important. Laterally, the rectum comes into relation with the para-rectal fossæ in both sexes, and thus comes into contact (closer when distended) with the sacral vessels and nerves, and sometimes with the pyriformis muscle. In passing, one may note the lateral relation of the anal canal with the ischio-rectal fossa. Pus may burrow through the levatores ani or their fascia, and thus break into the ischio-rectal fossæ, from a focus high up in the pelvis. This should always be remembered when a spontaneous abscess presents itself here without rectal disease.

The blood supply and venous drainage of the rectum will not have to be considered in detail, except to make one point, and that is the free anastomosis between the portal and systemic circulations on the surface of the rectum. This is of importance in interpreting rectal findings in such conditions as cirrhosis of the liver, and right-sided congestive heart failure (tricuspid insufficiency).

THE NERVE SUPPLY AND INTERPRETATION OF RECTAL PAIN

The nerve supply to the rectum and anal canal comes partly from the sympathetic and partly from the cerebrospinal system. The rectum is supplied mainly from the sympathetic, and the anal canal chiefly from the cerebrospinal system. The sympathetic fibres come from the inferior mesenteric plexus through its subordinate superior hæmorrhoidal plexus, which accompanies the superior hæmorrhoidal vessels to the rectum, and from fibres of the two pelvic plexuses, which follow the middle hæmorrhoidal vessels. Further, entering into the formation of the pelvic plexuses are visceral branches of the cerebrospinal system, direct from the second, third, and fourth sacral nerves, conveying motor and inhibitory impulses to the rectal musculature. The nerve fibres are distributed to all structures of the rectal wall, including the

internal sphincter muscle, and as in the rest of the intestinal tract are arranged in two networks—Auerbach's plexus between the longitudinal and circular layers of the muscularis, and Meissner's plexus within the submucosa.

The innervation of the anal canal is from the cerebrospinal (autonomic) system through the third and fourth sacral and internal pudic nerves. The inferior hæmorrhoidal nerve, usually a branch of the pudic, accompanies the inferior hæmorrhoidal vessels across the ischio-rectal fossa, and supplies the external sphincter muscle, the muco-cutaneous lining of the anal canal, and the peri-anal skin. The perineal skin is innervated largely by cutaneous filaments of the perineal nerve, and the integument over the ischio-rectal fossa by off-shoots from the plexus formed by the three lower sacral nerves. The external sphincter ani receives its triple nerve supply from the third and fourth sacral nerves through (a) the inferior hæmorrhoidal branch of the internal pudic; (b) the deep perineal branch of the internal pudic; and (c) the perineal branch of the fourth sacral nerve. All of these branches possess both sensory and motor fibres, and within them are distributed the sympathetic nerve filaments.

Owing to its rich supply of sensory nerve endings the region of the anal canal is very highly sensitive. (More pain is caused by a fissura in ano than by an ampullary carcinoma). Painful sensations may be elicited for about one inch to one inch and a half above the pectinate line (usually one inch in the average person), but above this level the rectal mucosa is practically insensitive to tactile and thermal stimuli. Indeed, examinations and minor operations on the mucosa of the rectum proper can be carried out without annoyance to the patient. Unfortunately, for the same reason, carcinoma may reach an advanced stage before giving rise to any sensation of pain. An ill-defined sensation of fullness, characteristic of many conditions occurring in the alimentary tract, is doubtless a variety of muscle sense elicited by stretching the muscular coat on dilation of the bowel. The so-called referred pain from this region is of diagnostic import. It should be pointed out here that the nerves supplying the region of the anal canal are from the same spinal nerves as those to the genital organs, bladder and urethra. This accounts for the retention of

urine frequently occurring after rectal operations or manipulations; for the dyschesia (rectal constipation) in disease of adjacent rectal structures, and for the rectal pain (ano-rectal) and other varied symptoms in disease of pelvic structures surrounding the rectum. For example, pain from an anal lesion may be referred to the uterus, and, for the same reason, in cancer of the uterus rectal symptoms may be wrongly interpreted as the result of direct extension rather than as referred pain. Likewise the pain of an anal lesion, or a lesion of one of the surrounding structures, may be referred through the obturator nerve to remote parts, such as the hip-joint and the inner side of the knee.

Head's researches¹ on referred pain have shown that in the rectum the afferent inflow is from the second to the fourth sacral. The afferent inflow resembles the arrangement of the efferent outflow very closely. The rectum above the pectinate line (one inch above, usually) is insensitive to painful stimuli, but on the other hand is very sensitive to changes of intra-rectal pressure, and fairly responsive to temperature changes, *i.e.*, protopathic sensibility (just as in the œsophagus). The pain or response to a stimulus thus elicited high in the rectum, above the pectinate line, is usually referred to the lower sacral region or to some area on the body wall. If the rectum is distended with an enema, or for some reason its emptying is delayed or interfered with, the pain or discomfort will be referred to the lower sacrum or to the hypogastrium, in an area between the symphysis and the umbilicus. MacKenzie² points out in his monograph the explanation of the pain felt in the epigastrium and the umbilical region in most inflammatory diseases of the hollow viscera, and attributes it either to excessive peristalsis or stretching of the viscus in question. Head¹ suggests that when a painful stimulus is applied to a part of low sensibility, in close central connection with a part of much greater sensibility, the pain produced is felt in the part of higher sensibility. There still is a great deal to be explained in many of the phenomena of referred pain. Although the rectal mucosa itself above the pectinate line is insensitive to painful stimuli, yet it is quite responsive to pathological processes or disturbed function of its adjacent structures, the symptoms consisting of low

sacral pain, either dull or dragging, or pressure and discomfort in the hypogastrium.

The external sphincter is very important, and upon its integrity and passive resistance adequate control depends.

RECTAL MANIFESTATIONS IN LESIONS OF THE FEMALE PELVIS

Rectal disturbances have been observed in disease of the female pelvic organs. The pathological findings in the pelvis resulting in rectal disturbances have consisted of displacements, new growths, inflammations, disturbances of the menstrual function, and the various relaxations found in parous women (rectocele, etc.). In rectocele, with the anterior rectal support weakened, disturbances were common. In displacements of the uterus posteriorly, *i.e.*, in retroversio-flexion of this organ, obstinate constipation of the rectal or sigmoidal type (dyschesia) has been observed. In simple retroversio-flexion of the uterus the constipation is marked, but relieved by laxatives, particularly those producing liquid stools. This facilitates the passage of the stool past the obstructing body of the uterus, which is insinuated into the anterior rectal wall. These patients are relieved by maintaining the uterus in ante flexion by a pessary, or by assuming the knee-chest position before defaecation. Surgery is of course curative.

When the fundus of the uterus is fixed to the anterior rectal wall, where the retroversion is accompanied by pelvic inflammatory disease, and sometimes also complicated by disease processes in the cul-de-sac, constipation is marked and relieved only by laxatives. Here one often observes tenesmus following stool, and the sensation of a foreign body in the rectum. Dull pain in the lower sacrum and hypogastrium is common. In recent pelvic inflammatory cases where the whole pelvis is plastered by an inflammatory process a peri-proctitis is observed, with rectal pain, painful defaecation, and constipation. In old cases the uterus is found fixed, often adherent to the anterior rectal wall, with the rectum unusually fixed as well. Pelvic examination often reveals the so-called "plaster of Paris pelvis," and the resulting periproctitis frequently converts the rectum into a rigid tube. Constipation in such cases is well established. These patients will sometimes state that their bowels are regular, but on questioning one will

often elicit the information of frequent use of laxatives. Hæmorrhoidal dilatations are frequent in these cases, but not constant.

Enterocoele, particularly in women, and when of moderate degree, is not suspected. This is really a deep cul-de-sac of Douglas, which when particularly deep is filled with loops of bowel, slides in between the cervix uteri and anterior rectal wall, and forces itself into the anterior rectal wall, producing obstipation. The symptoms are inordinate constipation, and epigastric cramps, and, on rectal examination, one feels a bulging into the anterior rectal wall, easily pitted, with the uterus free. The rectocele can be easily reduced with the patient in the knee-chest position.

Uterine fibroids may become large enough to interfere with the normal passage of the stool through the rectum. Cases have been observed of large uterine fibroids, springing from the posterior surface of the uterus, which compress the rectum. Marked constipation has also been observed in cases of large fibroid uteri. Cathartics liquefying the stools are effectual. Solid tumours often prolapse into the cul-de-sac of Douglas, and may produce marked constipation and pain with the stool. Carcinoma of the uterus has been observed to produce a variety of signs and symptoms depending upon the stage of the disease. Direct extension to the rectal wall may produce continual agonizing pain, tenesmus, bloody stools and a marked exudative proctitis. Fistulous openings may be observed. Secondary infection may occur. The diagnosis is simple. One patient with cancer of the uterine cervix was seen with a marked proctitis. One patient with cancer of the uterine cervix, was seen with a marked proctitis, the result of a fair dose of radium, and not extension. This subsequently subsided. There may of course be an advanced carcinoma of the body of the uterus, or even its neck, without any rectal involvement.

In rectocele the diagnosis is easily made, usually by simple observation. The anterior support of the rectum is lost and a bulging forward of the anterior rectal wall results. This is aggravated by the faecal current, where there is really a large rectal diverticulum, from the dilatation forward of the anterior rectal wall. These patients have no pain, and one with a bad rectocele was able to satisfactorily empty her stool by forcing it out per vaginam.

In multiparæ where the levator apron is stretched (diastasis), even without obvious rectocele, constipation was repeatedly observed.

The pain of dysmenorrhœa has been in certain cases referred to the rectum. A free evacuation of the stools before the menstrual period has been observed to considerably lessen the menstrual distress.

RECTAL MANIFESTATIONS IN LESIONS OF THE MALE PELVIS

In the male lesions of any of the structures coming into relationship with the anterior wall of the rectum will produce symptoms. Gonorrhœal infection is the usual cause. Carcinoma of the prostate and vesical and low ureteral stone have also been observed to produce rectal symptoms. Acute prostatitis and prostatic abscess complicating gonorrhœa may produce painful defæcation. Prostatic abscess may occur long after the subsidence of a gonorrhœa, and may not be suspected as the cause of rectal pain. Rectal examination reveals a very tender or fluctuant prostatic lobe. Vesical stone and stone in the pelvic ureter may cause painful defæcation. In one case of stone in the ureter, seen during the crisis, the pain was referred to the back and down into the perineum and lower rectum.

Vesiculitis causes very painful defæcation, in addition to a sharp or dull constant perineal pain. When greatly distended, or when an abscess has formed, the sausage-shaped vesicle may be felt *per rectum*. Carcinoma of the prostate, when extension occurs to the rectum, has been observed to cause painful defæcation, bloody stools and tenesmus. In benign prostatism inordinate constipation has been observed. One patient, who was admitted to the genito-urinary service, had intractable constipation in addition to his prostatism; this prompted the urologist to suspect a sigmoidal growth. The bowel by radiography and subsequent study was found to be normal. It is difficult to believe that the enlarged prostate could be large enough to cause a mechanical obstruction. It appears that the residual urine, with the difficulty in voiding and straining, had produced a disturbance of rectal and sigmoidal evacuation. Rectal pain has not been observed in prostatism.

Rectal discomfort or actual pain, with constipation, has been observed often in youths

following sexual excitement. Painful vesicles have been felt *per rectum*. Very large hæmorrhoidal dilatations were observed in patients having difficulty in bladder evacuation. These cases were chiefly in old prostatitis and those with marked phimosis.

BILIARY DISEASE

In portal obstruction hæmorrhoids are frequently observed. Indeed an occasional hæmatemesis, or large internal piles, may be amongst the earliest or only indications of it. Internal hæmorrhoids in portal obstruction are of course dilatations of the superior hæmorrhoidal veins. Internal hæmorrhoids appearing in persons past forty, who have digestive disturbances and perhaps an occasional hæmatemesis, should make one consider a Laennec's cirrhosis. In large troublesome hæmorrhoids with anæmia one should make certain that the patient is not suffering from an ampullary or recto-sigmoidal cancer.

RIGHT-SIDED HEART FAILURE

In tricuspid insufficiency, in right-sided failure, in addition to the painful enlarged liver, the spontaneous appearance of internal hæmorrhoids has been noted. Passive congestion in the viscera has been observed to cause a troublesome diarrhœa, in cases where decompensation was not suspected.

DISEASE OF THE NERVOUS SYSTEM

Tabes dorsalis has been observed to cause some measure of rectal incontinence, along with prolapse of the mucosa, in cases of long-standing. In disturbed sphincteric control, neuro-syphilis should be ruled out. One patient was seen who made no mention of his soiling, which was observed at examination, and he was later proved to be suffering from tabes. In disseminated sclerosis some measure of rectal incontinence may be observed at some stage in the disease. These are the two common diseases of the nervous system in which some measure of incontinence has been observed. Naturally, there are a host of other cord and brain lesions that may cause this.

Functional rectal disturbances have been observed, especially in women—inordinate itching without due cause, dyschesia in nervous persons, and in cases of nervous temperament, complaints

about the odour of the stool. Temporary incontinence has been observed following or during attacks of epilepsy or hysteria.

DISEASES OF METABOLISM

A few remarks may be offered about pruritus ani. Diabetes has not been observed in these cases to any extent worth mentioning. The pruritus has been observed in conditions favouring congestion, such as biliary disease, and pelvic disease in women. Moisture has been found to be a frequent cause, as also local rectal disease, such as rectal tags, hæmorrhoids, fissure, etc. Inordinate constipation, pruritus, attacks of diarrhoea, and hæmorrhoids, have been observed in chronic nephritis and gout.

BLOOD DISEASES

There was no opportunity for the observation of a large enough group of these cases. In Hodgkin's disease, however, lymphoid infiltration of the rectal walls has been observed. One man, who at the present time is responding to radiotherapy, presented himself with low sacral and rectal pain and an intractable sciatica. The prostate was large and firm. Carcinoma of the prostate was considered, but with a history of two years' duration, this was not considered likely. Subsequently inguinal glands appeared, large, matted and firm. Carcinoma now seemed almost certain, until biopsy showed typical Hodgkin's glands.

FURTHER STUDIES ON USE OF WHEAT BRAN AS A LAXATIVE.—Cowgill and Sullivan have studied the laxative values of commercial wheat bran, a processed bran product, and a mixed diet of fruits and vegetables in a group of six male patients exhibiting varying degrees of constipation. The patients subsisted on carefully selected diets the fibre contents of which were determined by chemical analysis. The several criteria of laxative action developed in studies on healthy men were used in this investigation. In all but one instance, the commercial bran and the processed bran product, when fed in such amounts as to bring the daily fibre intake up to 90 mg. per kilogram of body weight, were efficacious in correcting the constipation, in contrast to fruits and vegetables, which proved to be satisfactory in only two cases. The commercial bran proved to be slightly superior to the processed bran product, but was much less palatable and proved difficult to ingest in reasonable quantity; no difficulty whatever was experienced in eating the processed product. The authors suggest that the smaller size of the fibre particle in the processed bran product is a factor tending to decrease slightly its laxative value. In the three cases in which satisfactory laxation was not secured when the patient was subsisting on the diet of fruits and vegetables, addition of the processed bran product resulted in the desired improve-

SPECIFIC INFECTIONS

Fistula in ano has been observed. Systemic tuberculosis was not demonstrated in any of those presenting themselves, at least no signs of active or recent tuberculosis. This of course, does not imply that these people may not have latent or healed tuberculosis. Condylomata have been observed in syphilis. Rectal strictures were not demonstrated in a large number of old syphilitics.

SENILITY

Prolapse of the rectal mucosa, atrophy of the peri-anal skin, and some degree of incontinence have been observed in several of a large group of senile chronic cases, sufferers chiefly from cardio-vascular-renal disease.

THE USE OF PURGATIVES

Rectal irritation, and even proctitis was observed in some addicted to the constant use of harsh cathartics, with frequent evacuations of liquid stools.

SUMMARY

A study of rectal signs and symptoms resulting from adjacent and systemic disease-processes has been presented. Careful appraisal of rectal signs and symptoms, with a careful and deliberate examination of the rectum and its surrounding structures, is an important aid to diagnosis.

REFERENCES

1. HEAD, *Brain*, 1893, 16: 55; *Ibid.*, 1894, 17: 339.
2. MACKENZIE, *Symptoms and Their Interpretation*, 4th ed., 1920, Shaw & Sons, London.

ment. In each of the five cases that presented constipation without any other symptoms, it was observed that the fraction of the fibre of the basal diet and of the fruits and vegetables that remained intact after passage through the alimentary tract was much less than was the case with the healthy men studied in the earlier investigations. The tendency to constipation that these patients exhibited was probably due to this fact. A diet of common foods that will suffice to promote satisfactory laxation in healthy persons evidently will do so in some of these patients but not in all, and, therefore, the latter require some form of roughage that will resist all decomposition. Both commercial wheat bran and the processed bran product tested in this study were found to be satisfactory sources of fibrous roughage for these patients. In the one case presenting the picture of so-called irritable colon, fibrous roughage in any form, whether commercial wheat bran, a processed bran product, or fruit and vegetables, was contraindicated. Agar-agar, on the other hand, when fed so as to give a roughage intake of about 50 mg. per kilogram daily, gave satisfactory results; when fed at a 90 mg. level of daily intake, it could not be tolerated. This observation in a single case suggests the advisability of further study of the clinical value of agar as a source of roughage.—*J. Am. M. Ass.*, March 18, 1933, 100.